Cur
X 1
1939

OISE
373.19 09713
O59Dt/c-Ia

P-616 12,000
MAY, 1939

ONTARIO

Department of Education

Courses of Study

Grade XI

GENERAL SHOP

Issued by Authority of
The Minister of Education

COURSES OF STUDY

for

Collegiate Institutes, High, and Continuation Schools, and
Public and Separate Schools

in

Grade XI

GENERAL SHOP

DRAFTING
APPLIED ELECTRICITY
FARM MECHANICS
FORGE AND VISE WORK
MACHINE SHOP PRACTICE
ORNAMENTAL METAL WORK
MOTOR MECHANICS
SHEET METAL WORK
WOODWORK

Curr
X1
1939

GENERAL SHOP COURSE OF STUDY Grade XI

DRAFTING

1. Machine Drawing—problems involving placement and projection of views, auxiliary views, sections and dimensioning; the use of several different scales; detail and assembly drawings of familiar objects including machine parts.

2. Building Construction:
   - (a) Problems involving the use of the more commonly used symbols indicating details of building construction, electrical work, plumbing and drain plans.
   - (b) Simple floor plans of structures such as a cottage or a farm building, using architectural conventions.
   - (c) Knowledge of the properties and purposes of the building materials commonly employed in the community. Simple sketching and lay out plans indicating the use of these materials.

3. Landscape Drawing—map making to scale, such as a lay out for a subdivision, park, farm or garden.

APPLIED ELECTRICITY

1. Circuits:
   - (a) Measurement of voltage drop in light, heat or power circuits.
   - (b) A circuit in which there is a constant supply voltage and combinations of various load units connected in series-parallel, parallel-series or both —in order to record current flow through each path, and combined resistance of grouping.
   - (c) Loss of useful energy due to heating of conductors. Necessity of adequate size conductors.
   - (d) More advanced practical wiring, including installation of branch circuits in buildings for light, heat and power, using non-metallic and metallic cable wiring. Lighting circuits controlled by one, two, three and four point switches. Heating circuits used in electric ranges, hot water heaters and electric grates.
   - (e) Examination of a service installation.

2. Measuring instruments—more extensive study of action, construction and use of D.C. voltmeters and ammeters.

3. Magnetic units—an experimental study of electro-magnets to show the effect of strength of current, number of turns, and material in core, on magnetic circuits.

4. Magnetism and induced currents—production and nature of induced currents, including the elementary laws of induction relating to direction of induced pressure.

5. Motors and generators—study of D.C. generators and motors (series, shunt and compound); stripping a small D.C. armature (model); making out data sheet and rewinding, using necessary tests as winding proceeds.

Ministry of Education, Ontario
Historical Collection

FARM MECHANICS

1. Lubrication—grades and proper use of lubricants for different types of farm machinery, such as engines, electric motors, windmills, pumps and binders.
2. Tool sharpening—use of grindstone, emery wheel, files and finishing stones in sharpening tools and implement cutters, such as axes, hoes, cultivator points, binder and mower knives; jointing, setting and filing of hand and circular saws.
3. Rope work and tackle blocks:
    - (a) A more extensive knowledge of strength and quality of rope required for a variety of farm purposes.
    - (b) Splices—short and long in heavy rope.
    - (c) Blocks containing one, two, three and four pulleys.
4. Belts and belt splicing:
    - (a) Various types of belts, such as leather, fabric and vee.
    - (b) Practice in splicing by gluing, lacing, and using rawhide and metal fasteners.
5. Farm repair work—repair of farm implements involving worthwhile operations in wood and metal such as replacing guards on cutter bars, sections in blades, adjusting binder knotters, replacing wooden slats and leather straps on binder canvases; grades of paint for farm buildings and equipment; simple harness repair jobs.
6. Concrete work:
    - (a) Proportions and methods of mixing.
    - (b) Types of mixing machines.
    - (c) Construction of simple wood and metal forms.
    - (d) Use and variety of reinforcing material.
    - (e) Selecting and testing aggregates.
7. Pipe work:
    - (a) Cutting, threading, fitting, and assembling pipe.
    - (b) Installation and maintenance of valves and fittings.

FORGE AND VISE WORK

1. Forge operations:
    - (a) Cutting, bending, drawing, upsetting, forging flats, punching, twisting; making and using templates for testing curves and lengths of duplicate parts.
    - (b) Brazing, welding, fastening with clips.
    - (c) Heat treating—hardening, tempering, testing, case hardening.
2. Vise work operations:
    - (a) Bending with the use of forms, twisting, drilling, countersinking, riveting, filing; finishing with abrasives, flat black and bronze paint, enamel, lacquer, and hammer; raising of flat surfaces.
    - (b) Cutting, bending, and drilling tube material, and finishing same.
    - (c) Tapping and threading:
        - (i) Tapping blind and through holes.
        - (ii) Threading with a die, National Standard and pipe threads.

MACHINE SHOP PRACTICE

1. Hand tools and bench work—more difficult operations in riveting, threading (taps and dies), and filing to size.

2. Lay out work and inspection checking—more advanced lay outs involving use of surface plate, surface gauge, thread gauge and micrometer gauge.

3. Machine tools and operations:
   - (a) Lathe—extension of work in turning operations between centres and on work mounted in chuck; right hand standard vee thread cutting; external taper turning; drilling and boring; repair and upkeep of belting.
   - (b) Drill press—drilling to lay out including depth; use of countersink; spot facing; drawing holes to desired location; drilling for tapping; clamping of odd shape work.
   - (c) Grinder—grinding of lathe tool bits and drills; dressing of abrasive wheel; properties, selection and use of abrasives.

4. Fasteners—special uses and practice in the use of rivets, machine screws, cap screws, stud bolts, set screws, taper pins, keys.

5. Calculations—application of mathematical principles to gear ratios, speeds and feeds, tapers and threads.

ORNAMENTAL METAL WORK

1. Materials:
   - (a) Pipe, rod, sheet, and ingot forms of softer metals such as brass, copper, aluminium, lead; strap, bar and sheet iron, both black and galvanized, and sheet alloys of steel which may be workable with ordinary tools; angle iron, aluminium and brass; screening of copper, brass, iron.
   - (b) Solders and brazing materials for the various metals used.

2. Operations:
   - (a) Laying out drawings and patterns and transferring from measurements.
   - (b) Extension of work previously done in cutting, bending, twisting, drilling, filing, and riveting.
   - (c) Fastening with bolts, nuts, and machine screws, and tapping holes for same.
   - (d) Hammering for raising and sinking, to include curving of edges and fluting of sides, annealing, pickling, matting, lining, piercing, punching, punching for tapping, etching, planishing, polishing, cleaning and buffing.
   - (e) Making of the various joints.
   - (f) Soldering and brazing.
   - (g) Use of a variety of finishes, to include painting, lacquering, heat and chemical colouring.
   - (h) Metal spinning in the lathe.

MOTOR MECHANICS

1. The automobile engine:
    - (a) Removing and replacing gaskets.
    - (b) Piston displacement and compression ratio.
    - (c) Removing and replacing pistons and connecting rod assemblies.
    - (d) Checking cylinder condition for wear.
    - (e) Adjusting valves.

2. The automotive electric system:
    - (a) The battery—its care and service operations.
    - (b) The starter and generator—general principles and simple service adjustments.
    - (c) The lighting system—kinds of cables and terminals, types of lamp bulbs, adjustment of head lamps.

3. Ignition system—simple adjustments, such as cleaning distributor, adjusting spark plugs, servicing connecting wires.

4. Carburetion:
    - (a) Principle and construction of the single-throat carburetor.
    - (b) Cleaning and simple adjustments.

5. Transmission system:
    - (a) Dismantling and assembling a clutch.
    - (b) Study of the transmission unit—tracing path of power and determining speed ratio for each shift.
    - (c) Examination of a rear axle unit.

6. The steering gear and front wheels—examination of a typical steering and linkage assembly.

7. Brakes:
    - (a) Examination of mechanical and hydraulic braking systems.
    - (b) Adjusting two types of brake shoes.

8. Traffic regulations—a study of important rules and regulations of the Ontario Traffic Act

SHEET METAL WORK

1. Hand tool operations:

    The hand tool operations as outlined in the grade IX course applied to more difficult problems requiring parallel and radial development, and to rectangular shapes with splayed sides; greater facility in the use of the soldering iron; sweat soldering and riveting.

2. Machine tool operations:

    More extended use of all tools and machines; operations of Grade X continued; the setting and adjustment of machine tools to allow for gauge, kind of metal and for wired edges.

3. Problems:
   Practical application in such objects as two-piece elbows, funnels, pails, cups, flaring pans, jardiniers, window boxes, and scoops.

WOODWORK

1. Materials:
   - (a) Lumber—the common Canadian woods, plywood, composition board.
   - (b) Trimmings—Bakelite fittings, compo carvings, transfers.
   - (c) Hardware—hinges, locks, and catches of various kinds.

2. Hand tool operations:
   - (a) More difficult operations, such as sawing tenons and dovetails, boring for dowels, shaping mouldings or band sawn legs, scraping hard woods.
   - (b) Jointing, setting and filing rip and crosscut saws; sharpening the more difficult tools, such as scrapers and carving gouges.

3. Machine tool operations:
   - (a) Variety saw—cutting grooves, dados, tenons, mitres.
   - (b) Band saw—sawing curves.
   - (c) Drill press—boring operations, cutting mortises, simple shaping and routing.
   - (d) Jointer—surfacing, jointing edges, cutting rabbets.
   - (e) Lathe—turning matched parts as legs, pairs of candlesticks, turning ornaments, knobs, turning glued-up work.
   - (f) Drum and disc sanding operations on the lathe when there is no special machine available.

4. Maintenance—the care, adjustment, and fitting of all attachments to the machinery.

5. Wood finishing:
   - (a) The use and care of finishing materials, particularly of brushes.
   - (b) More advanced knowledge of water and oil stains, mixing of fillers, use of shellac, varnish and lacquer.
   - (c) More expert treatment of rubbing and polishing, and the refinishing of used furniture.